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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,665	04/09/2004	Chien-Min Sung	22762	8792
7590 12/27/2005				
THORPE NORTH & WESTERN, LLP P. O. Box 1219 Sandy, UT 84091-1219			EXAMINER RACHUBA, MAURINA T	
			ART UNIT 3723	PAPER NUMBER

DATE MAILED: 12/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/821,665	Applicant(s) SUNG, CHIEN-MIN	
	Examiner M Rachuba	Art Unit 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-27 and 30-45 is/are pending in the application.
- 4a) Of the above claim(s) 14-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 4-13 27 30-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group 1 in the reply filed on 02 May 2005 is acknowledged.

2. Claims 14-26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02 May 2005.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4-13, 27, 30, 31, 32, 33, and 37-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort et al, US005219462A in view of Homola US 20040096705A1.

5. '462 discloses the claimed invention, including) a polishing layer attached to the substrate, the polishing layer including a plurality of projections spaced apart at a projection loading ratio of from about 0.05 to about 0.5, (in that the recesses in which the projections are formed have a maximum dimension of 10 to 5000 micrometers, and an area spacing of 2 to 10,000 recesses/cm²), but does not disclose that the abrasive particles are nanodiamond particles have a particle size from about 1 nm to about 50 nm or from about 2 nm to about 10 nm; the nanodiamond particles include a

carbonaceous coating; or the nanodiamond particles are synthesized by an explosion synthesis process. '705, in a fixed abrasive tool, teaches using nanodiamond particles have a particle size from about 1 nm to about 50 nm or from about 2 nm to about 10 nm; the nanodiamond particles include a carbonaceous coating (the result of the explosion synthesis process); or the nanodiamond particles are synthesized by an explosion synthesis process, [0005], [0007], [0009], [0026], [0029], [0030]. It would have been obvious to one of ordinary skill in the art to have provided '462 with the nanodiamond particles taught by '705, to produce a smoother workpiece surface with enhanced properties [0030].

6. '462 also teaches an abrasive concentration, by *weight* of 5 to 95%. While there is no direct correlation between content by volume and content by weight, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided '462 with an abrasive concentration of 5-60% vol or 10-30% vol, as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. '462 also discloses that additional materials may be used with the binder and abrasive. See column 9, lines 28-40.

8. Regarding claims 32, 33, and 37-45, '462 does not disclose the rate of material removal, the range of pressure, the surface roughness, that the workpiece is a member of the group consisting of silicon wafers, integrated circuitry, gemstones, and hard drive platters, or that the tool is used as a CMP polishing pad. '705 teaches that the use of

nanoparticles allows for a workpiece having a Ra of 1.6 (Table 1). It would have been obvious to one of ordinary skill that by providing '462 with the nanoparticle abrasive of '750, that the resulting workpiece would have a smaller Ra, of less than 1nm, or from about 2 Angstrom to about 10 angstrom. Regarding the pressure used to polish, and the range of material removal rates, it is inherent that pressure be applied between the tool and workpiece as material removal requires contact and relative motion between the tool and workpiece, and it is inherent that an amount material be removed as a function of time. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided '462 with the pressure ranges and rates of material removal desired, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruxvoort et al, US005219462A in view of Homola US 20040096705A1 as applied to claim 27 above, and further in view of JP 11-333706. '462 as modified by '705 discloses providing a polishing liquid during polishing, but not that the polishing liquid is a moderate solvent for the organic matrix; the polishing liquid substantially free of abrasive particles, or that the polishing liquid dissolves the matrix at points of contact at a rate from about 1 Angstrom/min to about 100 Angstrom/min. JP'706 teaches in a CMP process providing a polishing liquid to dissolve the matrix to free abrasive particles from an organic matrix in a fixed abrasive tool. It would have been obvious to one of ordinary skill to have provided '462 as modified by '705 with the polishing liquid as taught by

JP'406, to allow fresh particles in the matrix to be uncovered and used. Regarding the rate of dissolving, JP '706 discloses that the matrix is dissolved, inherently over time, and it would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided a dissolving rate of from about 1 Angstrom/min to about 100 Angstrom/min since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Response to Arguments

10. Applicant's arguments with respect to claims 1, 4-13, 27, and 30-45 have been considered but are moot in view of the new ground(s) of rejection. The examiner agrees that Hibbard does not teach the invention as now claimed. However, '462 does disclose the invention as now claimed, except for the abrasive, taught by Homola.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M Rachuba whose telephone number is 571-272-4493. The examiner can normally be reached on Monday-Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 571-272-4485. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M Rachuba
Primary Examiner
Art Unit 3723

